REPORT ON
RCRA FACILITY INVESTIGATION
INVESTIGATION DATA REPORT NO. 1

DELPHI CORPORATION
DELPHI ENERGY & CHASSIS SYSTEMS
PLANT 400
1300 NORTH DORT HIGHWAY
FLINT, MICHIGAN

US EPA ID # mid 005 356 647
VOLUME 1 OF 2

by:

Haley & Aldrich of Michigan, Inc.
Detroit, Michigan

for:

Delphi Corporation
Troy, Michigan

File No.: 49017-017
28 March 2003

HALEY & ALDRICH

UNDERGROUND
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MEMORANDUM

28 March 2003
File No. 49017-017

TO: U. S. Environmental Protection Agency
Patricia J. Polston

C: Tim J. Renner, Delphi Corporation
Kim Cizerle, Environ International, Inc.
Kevin Holdwick, Michigan Department of Environmental Quality

FROM: Haley & Aldrich, Inc.
Lloyd S. Ross

SUBJECT: Field Event #1 Data Evaluation Figures and Boring Log Update
Voluntary RFI Investigation
Delphi Flint East, Plant 400, Dort Highway
Flint, Michigan

Please find enclosed summary tables and figures that provide the results of the risk-based screening evaluation of data collected during Field Event #1 of the voluntary RCRA Facility Investigation (RFI) for the Delphi Flint-East Plant 400 located in Flint, Michigan. Also included (Appendix D) are log reports of borings and monitoring wells installed as part of the RFI that were not included in the December 2002 Current Conditions Report. Soil and groundwater risk-based screening results are presented in summary tables in Appendix E.

The enclosed figures (Appendix A through C) represent one aspect of the data evaluation conducted. The figures present the risk-based screening results used to determine whether the nature and extent of the hazardous constituents at Areas of Investigation (AOIs) have been defined to fulfill the data requirements of the Environmental Indicator (EI) determination. We will use the results of the risk-based screening evaluation, along with field observations and professional judgment, to plan the RFI Field Event #2 field investigation activities.

Evaluation Of RFI Field Event #1 Data

The characterization data collected during Field Event #1 were evaluated to identify environmental conditions that may warrant further investigation. Approximately 231 soil, 4 free product, 57 groundwater grab samples (collected from open bore holes), and 59 monitoring well groundwater samples were collected during Field Event #1 (not including field replicates and other quality control samples). In addition, the site environmental

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database used in this screening includes approximately 281 soil, 48 borehole groundwater, and 108 monitoring well groundwater samples from pre-RFI investigation, and 32 samples collected and analyzed using a mobile laboratory deployed on site. This combined data set includes over 37,500 analytical measurements. Approximately 7,282 of these results were measured above detection limits.

To efficiently evaluate the large amount of data, generic human-health risk-based screening levels were used to identify locations where constituents are present at concentrations that may warrant additional investigation.

The screening criteria used for the evaluation of the Field Event #1 data are risk-based screening levels/methodologies developed under the Michigan Part 201 Generic Cleanup Criteria. A concentration higher than a screening level does not mean that a significant risk exists. Rather, the concentration is identified for further review relative to:

- Concentrations of the constituent at other locations and depths,
- Distribution of the constituent in other environmental media,
- Background levels,
- Field observations, and
- Previously identified or additional areas of interest (based on operational history in the vicinity of the sample location).

The results of this review provide one basis for developing plans for additional characterization activities (i.e. Field Event #2). However, they do not provide an assessment of the potential significance of risk associated with the presence of constituents at an AOI. Such an assessment will be performed at the completion of RFI field investigations.

The analytical data collected during Field Event #1 were validated in accordance with the Quality Assurance Project Plan (March 2003). Replicate or field duplicate analyses were screened individually and are presented on the figures.

Soil

To determine whether additional soil sampling should be considered, Field Event #1 soil results were screened against the following Michigan Part 201 Industrial/Commercial Generic Cleanup Criteria (GCC), as published in December 2002:

- Volatilization to indoor air from soil
- Infinite source volatilization to ambient air
- Soil particulate inhalation
- Direct contact (Industrial/commercial II)

This initial screening evaluation did not include a background analysis for naturally occurring inorganic constituents. A complete background analysis will be conducted as part of Field Event #2.

Based on the screening criteria listed above, a soil constituent list was generated, including those constituents that were detected in one or more samples above the most conservative residential criteria for the above-listed routes of exposure. The constituents that are presented in the figures represent this list.

Based on the current conceptual model for the site, these screening criteria are considered to be conservative. The site has been used for industrial purposes for approximately 80 years and the site use is expected to remain commercial/industrial in the future. Future residential use of the property is not considered a reasonably likely scenario.

Groundwater

To assess whether additional groundwater sampling should be conducted, Field Event #1 groundwater results for the site were screened against the following Michigan Part 201 Generic Cleanup Criteria (GCC), as published in December 2002:

- Industrial/commercial drinking water
- Groundwater contact
- Industrial volatilization to indoor air
- Groundwater surface water interface criteria (as applicable)

Based on the screening criteria listed above, a constituent list was generated, including those constituents that were detected in one or more samples above the most conservative residential drinking water and volatilization to indoor air criteria. The constituents that are presented in the figures represent this list.

Based on the current conceptual model for the site, these screening criteria are considered to be conservative. Based on the conceptual model for groundwater use at and adjacent to the site, the drinking water criteria are considered to be conservative because there is no current on-site use of groundwater. Shallow groundwater present in the overburden is not reasonably likely to be used as a drinking water source. Exposure to this shallow groundwater is more likely to occur during short-term excavation activities. Direct contact criteria for groundwater that are published by the MDEQ for this scenario are considered relevant to shallow groundwater and are readily available for screening this data set.

Screening Results

Analytical data for constituent concentrations above any of the above-identified screening criteria for soil or groundwater are so indicated on the enclosed figures. Table 1 summarizes

the Field Event #1 activities, overall screening results, and anticipated Field Event #2 activities (if any) at each AOI.

The enclosed soil figures (Appendix A and Appendix C) represent the following:

1. Figures 1A through 12A: As described above, the soil constituent list includes all constituents that were detected in one or more samples above the most conservative residential criteria. As such, constituents that may not have been detected at/above this level within a particular AOI will still be presented in the figures. On-site analytical data for constituent concentrations above the screening criteria described above for industrial land use are presented in red. Off-site analytical data that exceeded the soil screening criteria described above for residential land use are presented in cyan. Additional investigation may be required where results are greater than the identified screening criteria.

2. Figures 1C though 9C: Analytical data from soil samples located directly above the water table for constituents that exceed the Michigan DEQ Part 201 Residential Drinking Water Protection (soil leaching to groundwater) screening criteria are shown on Figures 1C through 9C. This screening is based on a conservative assumption that groundwater is a drinking water source. The soil data that exceed the screening criteria may indicate that further evaluation of the soil migration to groundwater pathway is necessary in the AOI.

   Groundwater potentiometric surface contours are superimposed on these figures. Also shown on these figures are the groundwater monitoring and screening results (where available). Concentrations exceeding groundwater screening criteria are highlighted in red.

The enclosed groundwater figures (Appendix B) represent the following:

1. Figures 1B through 6B: As described above, the groundwater constituent list includes all constituents that were detected in one or more samples above the most conservative residential criteria. On site analytical data for constituent concentrations that exceed the screening criteria described above for industrial use are presented in red. Analytical data for constituent concentrations that exceed the screening criteria described above for residential use and groundwater surface water interface (GSI) are presented in cyan and green, respectively. Although there is no current groundwater use at the site, the data that exceed these screening criteria may indicate that further evaluation of groundwater is necessary in the AOI.

As identified above, the screening described herein is a preliminary evaluation, designed to identify, in conjunction with field observations and professional judgment, whether further investigation is warranted at an AOI. If you have any questions or require additional information, please contact us.

LIST OF ATTACHMENTS:

Table I. Summary of AOI Activities
Table II. Summary of Horizontal Hydraulic Conductivity Data
Figure 1. Geologic Cross-Sections
Figure 2. Aquitard Between First and Second Saturated Zones
Figure 3. Potentiometric Surface Contours - December 2002
Figure 4. Crane Bay Fee Product Delineation Screening

Appendix A. (Volume 1)

Figure 1A. Soil Analytical Results for AOI-8 Former Hard Chrome Plating Line and AOI -9 Barrel, Rack, and U1 Plating Lines.
Figure 2A. Soil Analytical Results for AOI-11 Executive Garage.
Figure 3A. Soil Analytical Results for AOI-13 Gridley Area and AOI-31 Former Diesel UST (#4052)
Figure 4A. Soil Analytical Results for AOI-14 Phosphater and AOI-16 Udylite Plating
Figure 5A. Soil Analytical Results for AOI-18 Former Zinc Dichromate Plating Lines and AOI-21 Used Oil UST Tanks #4024 & #4025.
Figure 6A. Soil Analytical Results for AOI-23 Automatic Screw Machine Basement, AOI-24 Former Stoddard Tanks, and AOI-37 Former Used Viscor UST.
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Figure 12A. Sitewide Soil Analytical Results

Appendix B. (Volume 1)

Figure 1B. Groundwater Analytical Results for AOI-11 Executive Garage
Figure 2B. Groundwater Analytical Results for AOI-13 Gridley Area
Figure 3B. Groundwater Analytical Results for AOI-26 and AOI-27.
Figure 4B. Groundwater Analytical Results for Building 4082 (AOI-49) and AOI-8 Former Hard Chrome Plating Line.
Figure 5B. Groundwater Analytical Results Davison Road Northwest Property Boundary.
Figure 6B. Groundwater Analytical Results North Dort Highway Northwest Property Boundary.

Appendix C. (Volume 1)

Figure 1C. Soil DWP Screening for AOI-8 Former Hard Chrome Plating Line and AOI - 9 Barrel, Rack, and U1 Plating Lines.
Figure 2C. Soil DWP Screening for AOI-11 Executive Garage.

Appendix C (Volume 1) (continued)

Figure 3C. Soil DWP Screening for AOI-14 Phosphater, AOI-16 Udylite Plating, and AOI-13 Gridley Area.

Figure 4C. Soil DWP Screening for AOI-18 Former Zinc Dichromate Plating Lines and AOI-21 Used Oil UST Tanks #4024 & #4025.

Figure 5C. Soil DWP Screening for AOI-23 Automatic Screw Machine Basement, AOI-24 Former Stoddard Tanks, and AOI-37 Former Used Viscor UST.

Figure 6C. Soil DWP Screening for Building 4082.

Figure 7C. Soil DWP Screening for AOI-45 Compactor

Figure 8C. Site Soil DWP Screening.

Figure 9C. Soil DWP Screening for AOI-25 Former Fire Training Area.

Appendix D. (Volume 2)
Boring and Monitoring Well Installation Reports

Appendix E. (Volume 2)
Soil and Groundwater Risk-Based Screening Results

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Tables

TABLES

TABLE I
SUMMARY OF RFI ACTIVITIES BY AREA OF INTEREST
FLINT-EAST - PLANT 400
DORT HIGHWAY
FLINT, MICHIGAN

AOI Designation	ADDITIONAL RFI ACTIVITIES	Screening Results	Reference Figures	FIELD EVENT #1 INVESTIGATION Field Investigation Activity	Number of Groundwater Samples	Number of Soil Samples	Analytical Testing
NA Facility-wide Groundwater Sampling	During FE#2, additional monitoring wells or piezometers will be installed for supplemental site-wide hydrogeologic data. This information will be to refine the groundwater flow directions and evaluate vertical hydraulic conductivity of aquitard between first and second saturated zone. In addition, Gilkey Creek gauging stations will be established.	Data collected includes horizontal hydraulic conductivity, groundwater potentiometric surface contours, refinement of site hydrogeologic conceptual model. Two previously unidentified AOIs (AOI-49 - Building 4082 and AOI-50 - Crane Bay) were added to the vRFI.	Various	Groundwater Quality Information was collected from selected existing and new monitoring wells.	29	-	TCL, VOCs, TCL SVOCs, TAL Metals, TCL PCBs
AOI-01 Cyanide Lift Station	NFI						
AOI-02 Former Spray Booth	NFI						
AOI-03 Former Plating Operations	NFI						
AOI-04 Former Plating Operations	NFI						
AOI-05 Scrap Metal Collection Area	NFI						
AOI-06 Former Degreaser	NFI						
AOI-07 Former Zinc Die Cast Area	NFI						
AOI-08 Former Hard Chrome Plating Line (Building #4082)	Groundwater investigation in FE#2 to confirm bore hole water results, delineate extent of chromium in groundwater (if applicable), and evaluate potential sources of the chromium (if applicable). Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** Concentrations of hexavalent chromium detected above industrial drinking water criteria in one bore hole water sample. Other inorganics were detected in bore hole water samples above industrial drinking water criteria. **DWP:** Some inorganics detected above DWP criteria.	Figures 1A, 4B, 1C.	Installed 2 soil borings in conjunction with 2 monitoring wells installed as part of Facility-wide Groundwater Investigation.	2	4	TAL Metals, hexavalent chromium, cyanide
AOI-09 Barrel, Rack, and U1 Plating Line	Additional soil sampling to evalute chromium species in soil and evaluate potential relationship between AOI-09 soil and AOI-08 groundwater. Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** Inorganics detected in bore hole water samples above industrial drinking water criteria. **DWP:** Some inorganics detected above DWP criteria.	Figures 1A, 4B, 1C.	Installed 4 soil borings	1	10	TAL Metals and cyanide
AOI-10 Power Wash Booth	NFI						
AOI-11 Executive Garage Area	Install one additional monitoring well during FE#2. Sample new and existing monitoring wells to determine current groundwater concentrations.	**Soil:** Pre-RFI BTEX concentrations less than industrial criteria. **GW:** Pre-RFI BTEX concentrations greater than industrial drinking water criteria. Groundwater use in area is deed restrictied. **DWP:** Pre-RFI BTEX concentrations greater than DWP criteria.	Figures 2A, 1B, 2C.	Groundwater flow and hydrogeologic interpretation			
AOI-12 Paint Booth and Paint Storage Area	NFI						
AOI-13 Gridley Area	Continue free product analysis and recovery in FE#2.	Continued free product recovery.	Figures 3A, 2B, 3C.	Interim Measures Evaluation 3 Product Samples, Product and Groundwater Measurements	3 (product)		TCL, VOCs, TCL SVOCs, TCL PCBs, TAL Metals, Viscosity, Density
AOI-14 Phosphater	Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** No samples needed. **DWP:** Some inorganics detected above DWP criteria.	Figures 4A, NA, 3C.	Installed 3 soil borings	-	6	TAL Metals
AOI-15 Roto-Header Department	NFI						
AOI-16 Udylite Coating	Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** No samples needed. **DWP:** Some inorganics detected above DWP criteria.	Figures 4A, NA, 3C.	Installed 3 soil borings	-	9	TCL, VOCs, TCL SVOCs, TAL Metals
AOI-17 Nickel Plating Lines	NFI						

TABLE I
SUMMARY OF RFI ACTIVITIES BY AREA OF INTEREST
FLINT-EAST - PLANT 400
DORT HIGHWAY
FLINT, MICHIGAN

AOI Designation	ADDITIONAL RFI ACTIVITIES	Screening Results	Reference Figures	FIELD EVENT #1 INVESTIGATION			
				Field Investigation Activity	Number of Groundwater Samples	Number of Soil Samples	Analytical Testing
AOI-18 Former Zinc Dichromate Plating Lines	Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** No samples needed. **DWP:** Some inorganics detected above DWP criteria.	Figures 5A, 5B & 6B, 4C	Installed 3 soil borings	-	9	TAL Metals
AOI-19 Former Zinc Hydroxide Tanks	NFI						
AOI-20 Former Degreaser	NFI						
AOI-21 Used Oil UST Tanks #4032 and #4033	Soil investigations in FE#2 to confirm methylene chloride concentrations. Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** No samples needed. **DWP:** Methylene chloride and some inorganics detected above DWP criteria.	Figures 5A, 5B & 6B, 4C.	Installed 4 soil borings	-	12	TCL, VOCs, TCL SVOCs, TCL PCBs, TAL Metals
AOI-22 Chip Collection Area	Installation of Monitoring Wells during FE#2 to sample soil and determine if free product is present.	No Field Event #1 Activity. Monitoring well installation planned during Field Event #2.	NA	Install 2 monitoring wells	-		TCL, VOCs, TCL SVOCs, TCL PCBs, TAL Metals
AOI-23 Automatic Screw Machine Basement	Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** No samples needed. **DWP:** Some inorganics detected above DWP criteria.	Figures 6A, NA, 5C.	Installed 3 soil borings	-	9	TCL, VOCs, TCL SVOCs, TCL PCBs, TAL Metals
AOI-24 Former Stoddard Tanks #4024 and #4025	NFI						
AOI-25 Former Fire Training Area	Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** No samples needed. **DWP:** Some inorganics detected above DWP criteria.	Figures 7A, NA, 9C.	Installed 5 soil borings	-	15	TCL, VOCs, TCL SVOCs, TCL PCBs, TAL Metals
AOI-26 Container Storage Area	Additional soil and groundwater investigation during FE#2 to confirm pre-RFI data. Background analysis to be performed in FE#2.	**Soil:** Pre-RFI concentrations less than industrial criteria. **GW:** Elevated chromium concentrations from bore hole water. Chlorinated compounds detected in groundwater above drinking water criteria. **DWP:** Pre-RFI concentrations of inorganics and volatile organic compounds detected above DWP criteria.	Figures 8A & 9A, 3B, 8C.	Sampled 15 monitoring wells	15	-	
AOI-27 Pump House/Lift Station and Eastern Process Sewer	Background analysis to be performed in FE#2.	**Soil:** Concentrations less than industrial criteria. **GW:** Volatiles detected in groundwater samples but appears related to AOI-26 or AOI-48. **DWP:** Some inorganics and volatiles detected above DWP criteria. Volatiles appears related to AOI-26 or AOI-48.	Figures 8A & 9A, 3B, 8C.	Installed 10 soil borings	7	12	TCL VOCs, TCL SVOCs, TAL
AOI-28 Molylube Line	NFI						
AOI-29 Former Paint Booth	NFI						
AOI-30 Former Degreaser	NFI						
AOI-31 Former Diesel UST (Tank #4052)	NFI	**Soil:** Concentrations less than industrial critieria. **GW:** No samples needed. **DWP:** Concentrations less than DWP criteria.	Figures 3A, NA, NA.	Installed 1 soil boring	-	3	TCL VOCs, TCL SVOCs
AOI-32 Terminal Post (T-Post) Oil Collection System	NFI						
AOI-33 Former Conformal Coating Operation	NFI						
AOI-34 Former Paint Booth	NFI						
AOI-35 Former Glass Frit	NFI						
AOI-36 Former Paint Booth	NFI						
AOI-37 Sump Collection System (Former Waster Viscor UST)	NFI	**Soil:** Concentrations less than industrial criteria. **GW:** No samples needed. **DWP:** Concentrations less than DWP criteria.	Figures 6A, NA, 5C.	Installed 1 soil boring	-	3	TCL VOCs, TCL SVOCs
AOI-38 Former Degreaser	NFI						

TABLE I
SUMMARY OF RFI ACTIVITIES BY AREA OF INTEREST
FLINT-EAST - PLANT 400
DORT HIGHWAY
FLINT, MICHIGAN

AOI Designation	ADDITIONAL RFI ACTIVITIES	Screening Results	Reference Figures	FIELD EVENT #1 INVESTIGATION			
				Field Investigation Activity	Number of Groundwater Samples	Number of Soil Samples	Analytical Testing
AOI-39 Former Degreaser	NFI						
AOI-40 Former Oleum UST (Tank #4023)	Installation of monitoring wells during FE#2 downgradient of general area to evalute soil and groundwater conditions.	No Field Event #1 Activity. Specific location of historical tank is unknown. Monitoring well installation hydraulically downgradient of the area planned during Field Event #2.	NA	Install monitoring well(s)	-		TCL VOCs, TCL SVOCs, TCL PCBs
AOI-41 Former Paint Booth	NFI						
AOI-42 Former Degreaser	NFI						
AOI-43 PCB-Containing Transformers	NFI						
AOI-44 Satellite Accumulation Areas	NFI						
AOI-45 Compactor	Additional soil Investigation during FE#2 to delineate the extent of benzo(a)pyrene in soil. Background analysis to be performed in FE#2.	**Soil:** Benzo(a)pyrene concentration in one shallow sample greater than industrial criteria. Area is covered with concrete. **GW:** No samples needed. **DWP:** Some inorganics detected above DWP criteria.	Figures 10A, NA, 7C.	Installed 3 soil borings	-	9	TCL VOCs, TCL SVOCs, TCL PCBs, and TAL Metals
AOI-46 Lead Solder Booth	NFI						
AOI-47 Zyglo Line	NFI						
AOI-48 Groundwater (Northwest potential off-site)	Installation of monitoring wells and piezometers FE#2 to confirm results and refine understanding of groundwater conditions.	On-going source area delineation. TCE detected north of Davison Road in samples collected in February 2003.	Various				
AOI-48 Groundwater (Southeast & Building 4111)	Installation of monitoring wells during FE#2 and groundwater sampling to confirm groundwater conditions.	**Soil:** Courtyard sample concentrations less than default industrial criteria. **GW:** Elevated concentrations of volatiles detected (mobile laboratory) in groundwater samples from beneath Building 4111. **DWP:** No concentrations above DWP criteria.	Various		4	-	TCL VOCs
AOI-49 Building 4082	Installation of monitoring wells during FE#2 to confirm soil and groundwater conditions.	**Soil:** Concentrations of volatile organic compounds above industrial criteria. **GW:** Concentrations of volatile organic compounds above industrial critieria. **DWP:** Concentrations of volatile organic compounds above DWP.	Figures 11A, 4B, 6C.	Source Area Delineation	6	12	TCL VOCs
AOI-50 Crane Bay	Installation of monitoring wells during FE#2 to confirm extent of free product, collect additional product samples, and confirm groundwater conditions.	Use of borings for visual evidence of free phase product. Area delineated based on visual evidence. Chlorinated compounds detected in LNAPL sample.	Figure 4	Installed 12 soil borings for visual evidence of free product	-	-	Visual Inspection

Notes and Abbreviations:
1. NFI - No Further Field Investigation during Field Event #2.
2. Shading indicates AOI with no further investigation based on findings of Current Conditions Report.
3. Chlorinated compounds detected in groundwater are being addressed under AOI-26, AOI-48, AOI-49, or AOI-50 even though concentrations may appear located within other adjacent AOIs..

TABLE II
SUMMARY OF HORIZONTAL HYDRAULIC CONDUCTIVITY DATA
MONITORING WELL SLUG TESTING
FLINT EAST, PLANT 400, DORT HIGHWAY
FLINT, MICHIGAN

Well Identification	Test Date	Measured Static Water Level (ft)	Corrected Static Water Level[2] (ft)	Well Casing Radius (ft)	Effective Well Radius (ft)	Saturation Thickness[4] (ft)	Effective Screen Length (ft)	Hydraulic Conductivity[1] (ft/min)	Hydraulic Conductivity[1] (cm/sec)
MW4101	09/25/01	7.58		0.19	0.33	3.7	3.7	4.2E-03	2.1E-03
MW4106	07/16/02	4.18	4.174	0.19	0.33	4.6	4.6	1.2E-02	6.1E-03
MW4113[5]	07/12/02	12.58	12.923	NA	NA	NA	NA	NA	NA
MW4601D	07/09/02	12.51	12.464	0.08	0.33	13.5	5	7.0E-04	3.6E-04
MW4601S	09/25/01	8.45		0.19	0.33	2.9	2.9	3.4E-03	1.7E-03
	07/10/02	8.25	8.21	0.19	0.33	3.1	3.1	1.5E-01	7.6E-02
MW4603	09/24/01	14.73	11.42	0.08	0.33	7.6	5	4.1E-03	2.1E-03
	07/10/02	14.12		0.19	0.33	4.7	4.7	2.0E-01	1.0E-01
MW4604D[6]	07/07/02	16.2	0.2	0.08	0.33	20.3	10	3.5E-02	1.8E-02
MW4605D	07/11/02	17.22	18.438	0.08	0.33	16.6	10	1.5E-02	7.6E-03
MW4605S	07/11/02	17.4	17.379	0.19	0.33	2.4	2.4	3.3E-02	1.7E-02
MW4606	09/25/01	9		0.19	0.33	3.3	3.3	1.4E-02	7.1E-03
MW4607	09/24/01	8.49		0.08	0.33	5.5	5	4.5E-04	2.3E-04
MW4608	07/11/02	5.8	5.699	0.08	0.33	6.8	5	2.2E-03	1.1E-03
MW4609	09/24/01	5.9		0.08	0.33	6.6	5	3.5E-04	1.8E-04
	07/10/02	6.2		0.08	0.33	6.3	5	1.3E-03	6.6E-04
MW4610D	09/24/01	16.17		0.08	0.33	13.3	5	3.9E-03	2.0E-03
	07/12/02	16.59	16.556	0.08	0.33	12.9	5	3.2E-03	1.6E-03
MW4610S	07/14/02	6.38		0.19	0.33	3.4	3.4	2.4E-02	1.2E-02
MW4612	09/25/01	18.03		0.19	0.33	2	2	1.6E-02	8.1E-03
	07/10/02	17.5		0.19	0.33	2.5	2.5	5.0E-02	2.5E-02
MW4614	07/16/02	8.73	8.694	0.08	0.33	5.3	5	4.9E-03	2.5E-03
MW4615D	07/10/02	21.02	21.011	0.19	0.33	2.8	2.8	1.8E-01	9.1E-02
MW4615D_36	07/10/02	21.02	20.984	0.19	0.33	2.8	2.8	1.8E-01	9.1E-02
MW4615S	07/10/02	7.75		0.19	0.33	2.6	2.6	1.7E-01	8.6E-02
MW4620D	07/10/02	15.49	15.316	0.08	0.33	14.7	5	3.6E-02	1.8E-02
MW4620S	07/17/02	15.45		0.19	0.33	2.4	2.4	4.1E-03	2.1E-03
MW4621D	07/17/02	15.92		0.08	0.33	15.1	5	5.4E-04	2.7E-04
MW4622D	07/17/02	16.25	14.82	0.08	0.33	18.2	5	1.4E-03	7.1E-04
MW4622S	07/17/02	7.55		0.19	0.33	4.3	4.3	8.2E-02	4.2E-02
MW4623D	07/11/02	15.61	15.589	0.08	0.33	26.4	10	3.3E-02	1.7E-02
MW4623S	07/14/02	15.9	15.85	0.19	0.33	4	4	2.8E-01	1.4E-01
MW4623S_36	07/11/02	15.9	15.896	0.19	0.33	3.9	3.9	3.6E-01	1.8E-01

Notes and Abbreviations:

[1]Determined via the Bouwer and Rice Method for unconfined saturated zones.

[2]If the recovered water levels were higher than the measured static water levels (SWL), then the SWL's inputted to the spreadsheet were changed to equal the recovered water levels recorded at the conclusion of the slug tests (assuming that all wells reached full recovery).

[3]Each well exhibits an initial decrease in water level (or random fluctuation) from time zero to approximately 0.25 minutes, which may indicate that the transducer wire was handled at the surface by the person conducting the test. As such, slug test data that was inserted into the spreadsheet calculations begin at the lowest recorded water level reading and corresponding time. The initial measurements were discarded. It is suspected that the handling resulted in a change in depth of the transducer, which would account for the differences between the recovered water levels and the measured static water levels; hence the need for correction of the static water levels for input into the spreadsheet (See note 2)).

[4]Bottom well depth, used to calculate Saturated Thickness (H), is assumed to be the bottom of the screen.

[5]A borehole log was not available for MW4113 and so a spreadsheet was not prepared for this well. Slug test data indicates that WL fluctuates throughout test and does not exhibit expected pattern towards recovery.

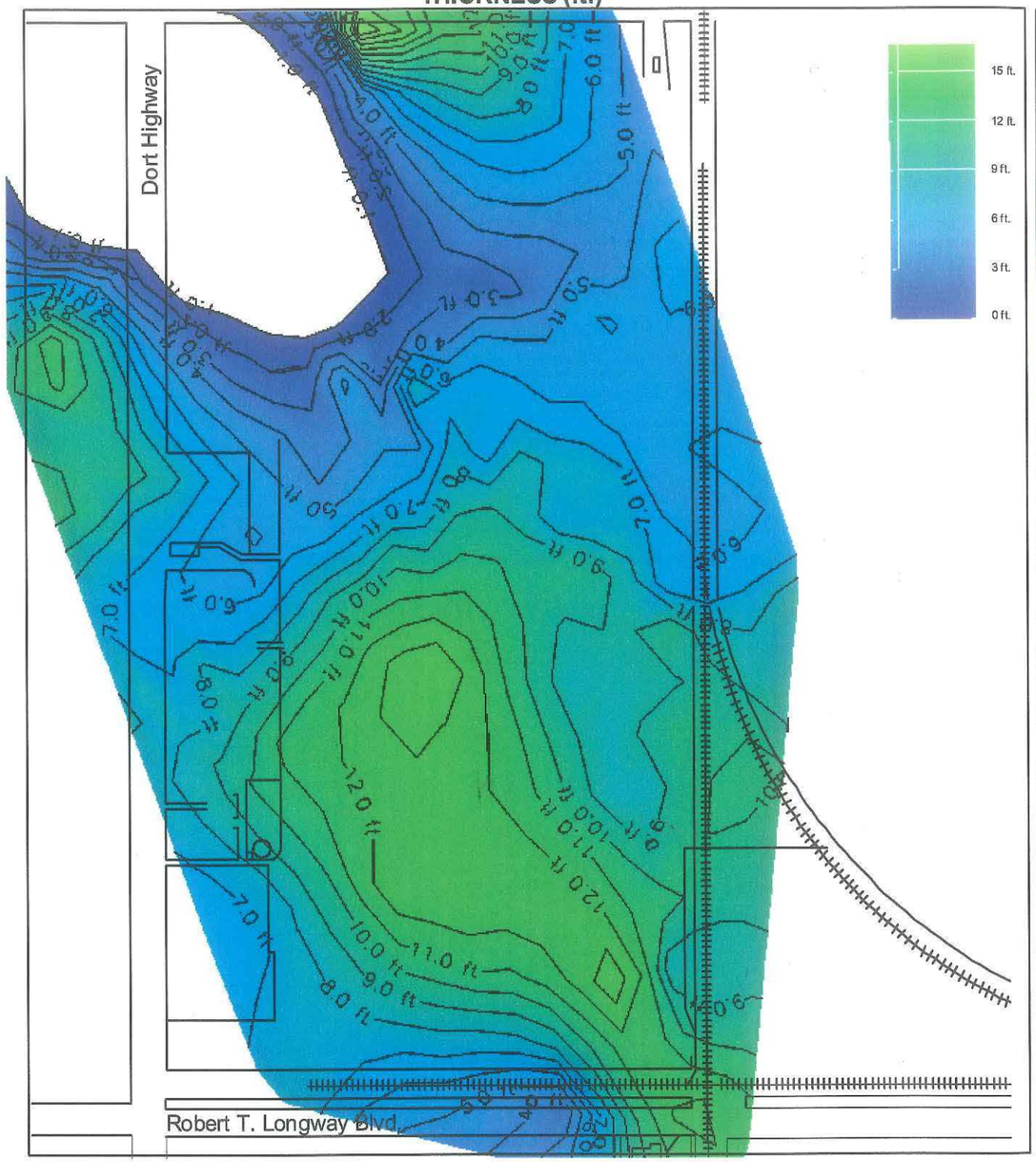
[6]Slug test results for MW4604D indicate water levels approximately 15 feet higher than the recorded SWL. The initial SWL that was calibrated on the instrument has a negative pressure.

[7]For those wells with SWL's above the screened interval, the first few points, which appear to be a straight-line segment on the Hydraulic Conductivity chart, should be representative of the aquifer's performance. For those wells with SWL's within the screened interval, the steep slope of the regression through the initial few points represent drainage of the sand pack. The slope of the regression line through the next set of points, which appear to be a second straight-line segment, were chosen to be representative of the undisturbed aquifer's behaviour. The occurance of the two straight-line segments in this situation is well-documented.

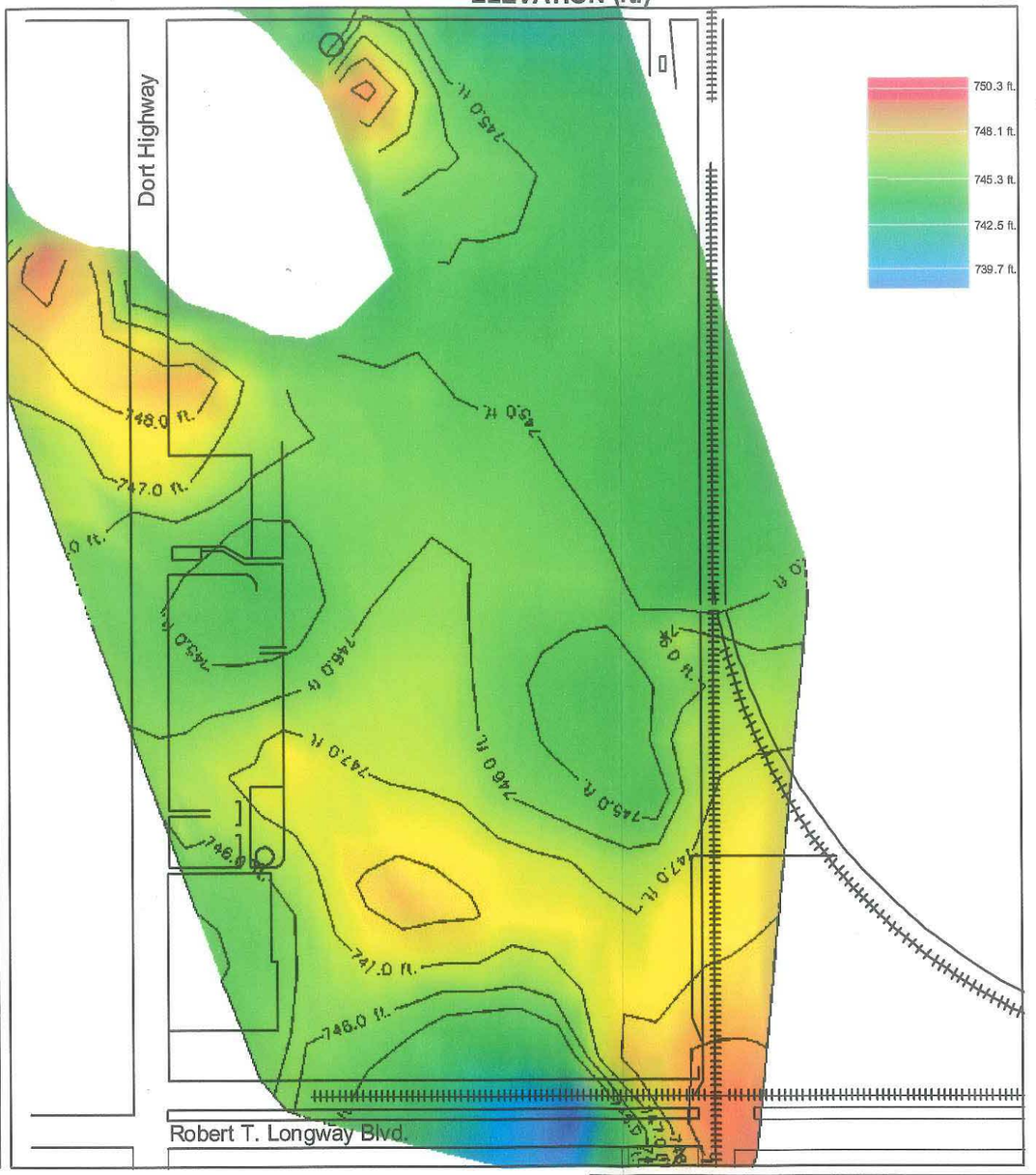
Figures

FIGURES

THICKNESS (ft.)



ELEVATION (ft.)



NOTES:

1. The inferred extent, thickness, and elevation of the aquitard is based on multiple borings not shown on plan.
2. Thickness and elevation contour lines are based on geostatistical analysis of available data encountered at site wide boring locations.
3. The extent, elevation, and thickness of the aquitard represents an interpretation of the subsurface conditions.
4. Actual conditions may differ from the representation shown above.

200 0 200 400 Feet

N

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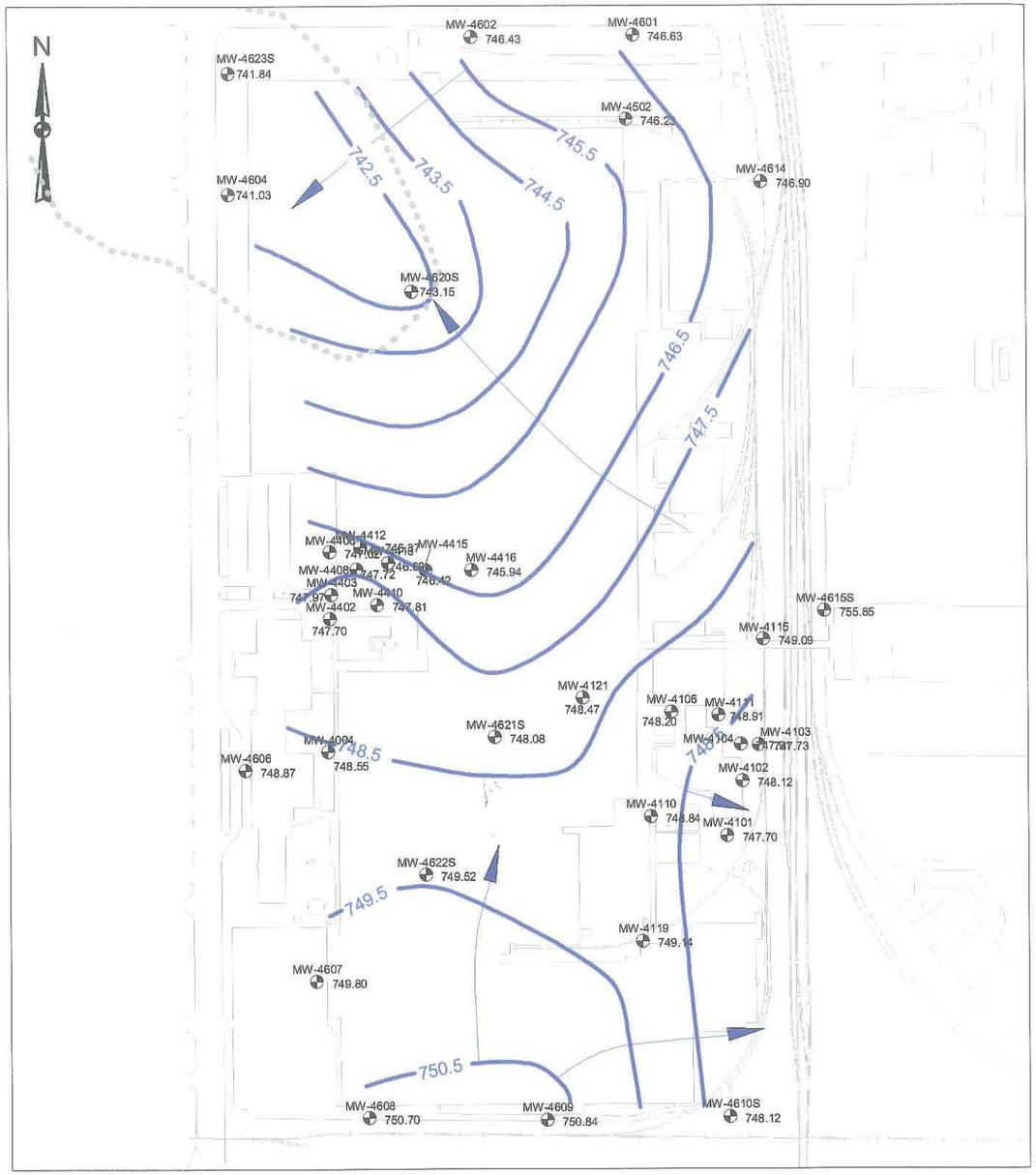
AQUITARD BETWEEN FIRST AND SECOND SATURATED ZONES

SCALE: AS SHOWN MARCH 21, 2003

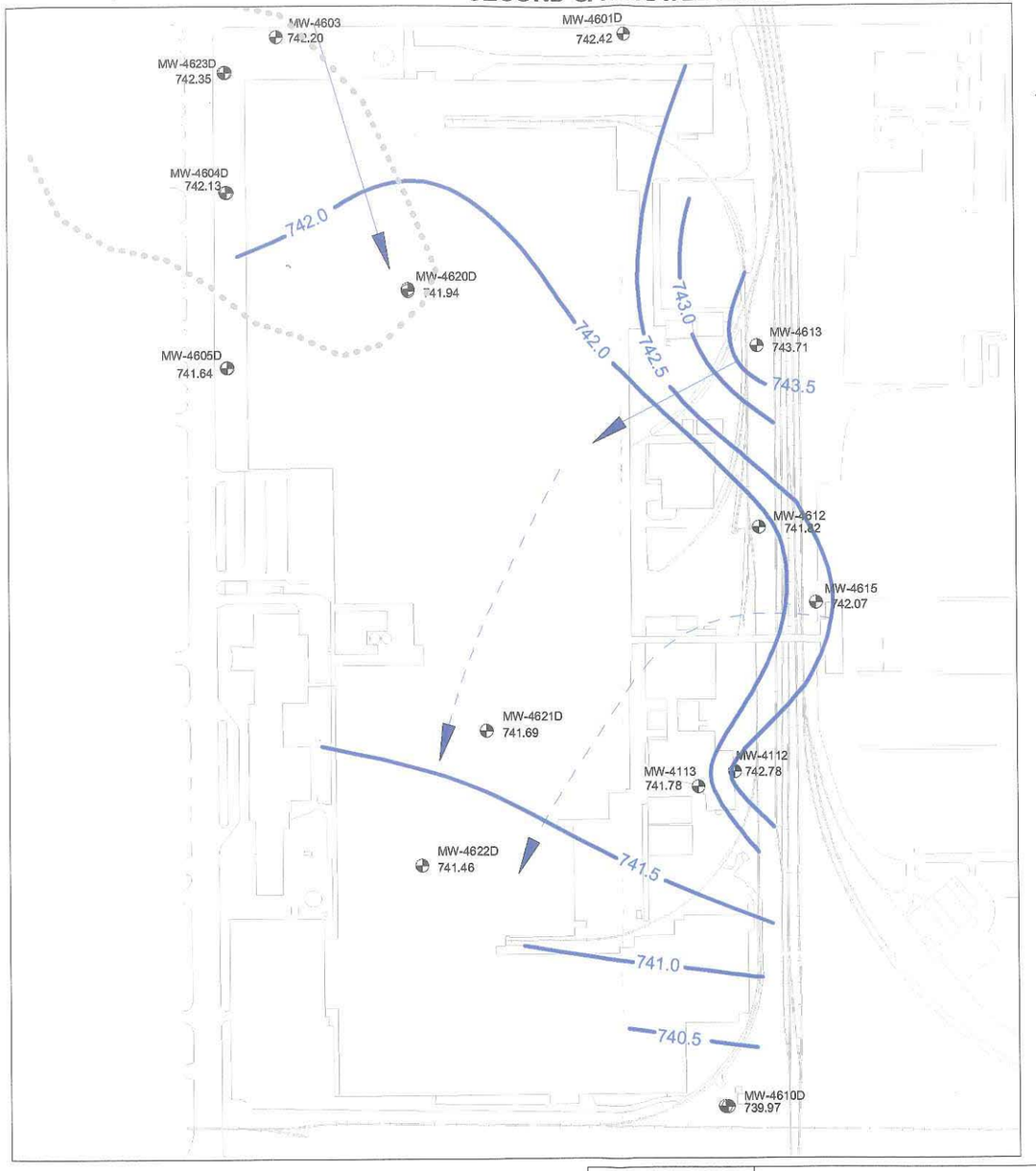
FIGURE 2

G:\49017\GIS\CLAYCLAY_ISOPACH.apr (49017\Database/Dort_Highway.mdb)

FIRST SATURATED ZONE



SECOND SATURATED ZONE



LEGEND

- Inferred Extent of Clay
- 748.6 Location of Monitoring Well and elevation datum used to generate potentiometric contours
- Potentiometric Surface Contour
- Inferred Groundwater Flow Direction

NOTES:

1. Groundwater measurements collected December 2002.
2. Elevation contours presented in this figure indicate general trends only. Actual field conditions may vary from the indicated contours.
3. The inferred extent of clay is based on multiple borings not shown on plan.
4. Groundwater flow can be influenced by the clay extent, underground appurtenances and localized geologic conditions.
5. Groundwater elevations based on survery performed by Hubble, Roth, and Clark, Inc. in June and July 2002.
6. Elevation refers to Hubble, Roth & Clark datum wherein EL USGS Vertical Datum is 0.79 ft above HRC site specific datum.

200 0 200 400 Feet

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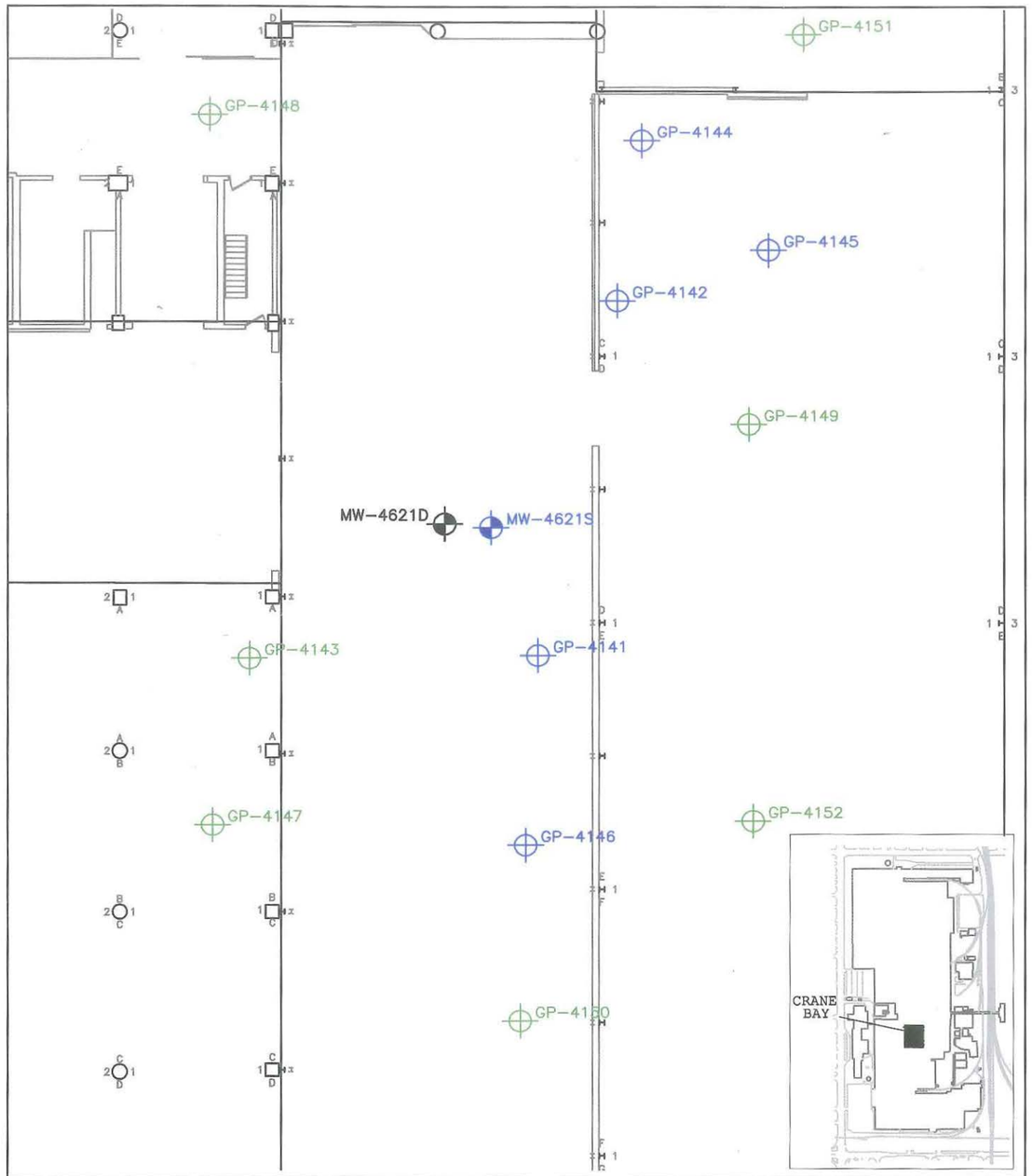
POTENTIOMETRIC SURFACE CONTOURS - DECEMBER 2002

SCALE: AS SHOWN MARCH 2003

FIGURE 3

G:\49017017\GWE\GWE3.apr (49017\Database\Dort_Highway.mdb)



LEGEND:

MW-4621D MONITORING WELLS

GP-4151 NO VISUAL EVIDENCE OF FREE PRODUCT

GP-4144 VISUAL EVIDENCE OF FREE PRODUCT

NOTES:
1. BASE PLAN PROVIDED BY DELPHI CORPORATION, INC.
2. LOCATIONS OF MONITORING WELLS AND GEOPROBE LOCATIONS ARE APPROXIMATE.

0 5 10 20
GRAPHIC SCALE IN FEET

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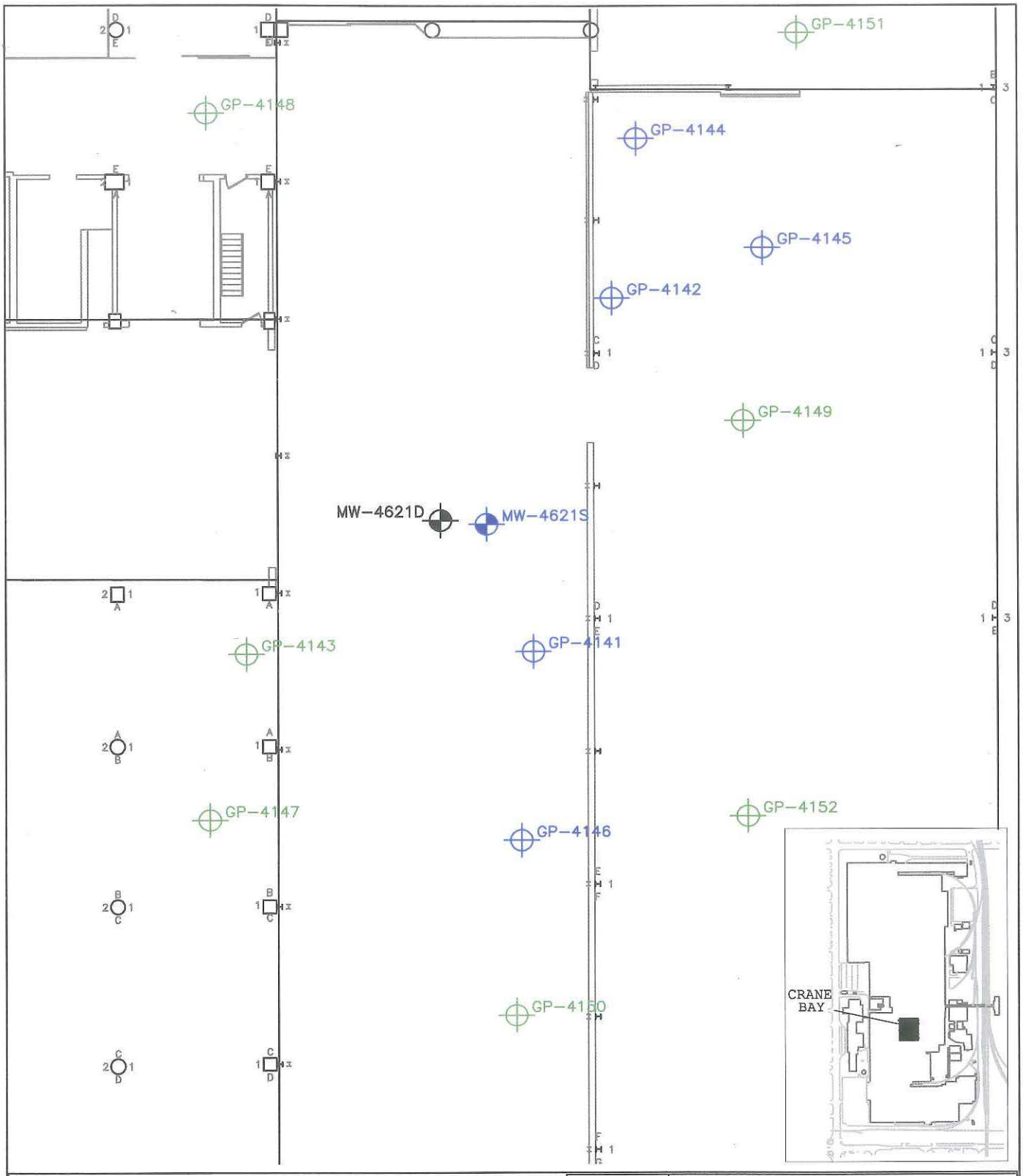
CRANE BAY FREE PRODUCT DELINIATION

SCALE: AS SHOWN

MARCH 2003

FIGURE 4



LEGEND:

- MW-4621D MONITORING WELLS
- GP-4151 NO VISUAL EVIDENCE OF FREE PRODUCT
- GP-4144 VISUAL EVIDENCE OF FREE PRODUCT

0 5 10 20
GRAPHIC SCALE IN FEET

NOTES:
1. BASE PLAN PROVIDED BY DELPHI CORPORATION, INC.
2. LOCATIONS OF MONITORING WELLS AND GEOPROBE LOCATIONS ARE APPROXIMATE.

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SCALE: AS SHOWN

MARCH 2003

FIGURE 4